

Appl. No. 10/696,721
Amdt. dated Feb 3, 2005
Reply to Office Action of Nov. 3, 2004

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A planar diaphragm loudspeaker for use in a suspended ceiling grid defining rectangular openings, comprising:

a rectangular, planar diaphragm formed of ~~a unitary piece of polymer material, the diaphragm sized to fit an opening of the ceiling grid, the diaphragm having a unitary construction to include and having~~ a front surface and a rear surface, the front surface of the diaphragm defining a three-dimensional, textured pattern across the entirety of the front surface; and

an electromagnetic driver coupled to the rear surface of the diaphragm such that the driver will cause the front surface of the diaphragm to vibrate and reproduce sound in response to an electrical signal.

Claim 2 (currently amended): A loudspeaker as set forth in claim 1, wherein the textured pattern is formed of perforations ~~and/or~~ or indentations in the front surface of the diaphragm.

Claim 3 (original): A loudspeaker as set forth in claim 1, wherein the textured pattern is etched into the front surface of the diaphragm.

Claim 4 (original): A loudspeaker as set forth in claim 1, wherein the diaphragm has regions of different densities, including

an outer region about the periphery of the diaphragm, the density of the outer region being at least 5 pcf throughout the outer region, thereby enabling the loudspeaker to be free of a peripheral frame attached to the diaphragm, and

an inner region circumscribed by the outer region, the density of the inner region being at or below about 3 pcf throughout the inner region.

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Claim 5 (original): A loudspeaker as set forth in claim 1, further comprising a shroud secured to the diaphragm; wherein the shroud and the diaphragm are securable in a first orientation for flush mounting and in a second orientation for tegular-drop mounting.

Claim 6 (original): A planar diaphragm loudspeaker for use in a suspended ceiling grid defining rectangular openings, comprising:

a rectangular, planar diaphragm of polymer material sized to fill an opening of the ceiling grid and having a front surface and a rear surface, the front surface defining a three-dimensional, textured pattern across the front surface; the diaphragm having regions of different densities, including

an outer region about the periphery of the diaphragm, the density of the outer region being at least 5 pcf throughout the outer region, and

an inner region circumscribed by the outer region, the density of the inner region being at or below about 3 pcf throughout the inner region;

a bracket rigidly attached to the diaphragm at two spaced locations in the outer region, the bracket extending across the inner region between the spaced locations; and

a first electromagnetic driver coupled to the bracket and coupled to the rear surface of the diaphragm within the inner region.

Claim 7 (original): A loudspeaker as set forth in claim 6, further comprising a shroud secured to the diaphragm; wherein the shroud and the diaphragm are securable in a first orientation for flush mounting and in a second orientation for tegular-drop mounting.

Claim 8 (original): A loudspeaker as set forth in claim 6, wherein:

the inner region includes a first region having a density between 1.5 pcf and 2 pcf and a second region having a density between 2 pcf and 3 pcf;

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the first electromagnetic driver is coupled to the rear surface of the diaphragm within the first region; and

the loudspeaker further comprises a second electromagnetic driver coupled to the bracket and coupled to rear surface of diaphragm within the second region thereof.

Claim 9 (currently amended): A loudspeaker as set forth in claim 6, wherein the diaphragm is a unitary piece and the textured pattern is formed of perforations ~~and/or~~ or indentations in the front surface of the diaphragm.

Claim 10 (original): A loudspeaker as set forth in claim 6, wherein the diaphragm includes granular material attached to the front surface thereof, thereby defining the textured pattern.

Claim 11 (original): A loudspeaker as set forth in claim 6, wherein the textured pattern is formed of a fiber compound adhered to the front surface of the diaphragm.

Claim 12 (original): A loudspeaker as set forth in claim 6, wherein the diaphragm is a unitary piece and the textured pattern is etched into the front surface of the diaphragm.

Claims 13 and 14 (canceled).

Claim 15 (currently amended): A method of manufacturing a planar diaphragm loudspeaker for use in a suspended ceiling grid defining rectangular openings, the method comprising:

producing a rectangular diaphragm of polymer material sized to fit an opening of the ceiling grid ~~and having~~, the diaphragm having a unitary construction to include a generally smooth front surface and a rear surface;

subjecting the diaphragm to a secondary operation to define a three-dimensional, textured pattern across the front surface of the diaphragm such that the front surface of the diaphragm contributes to the three-dimensional, textured pattern;

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coupling an electromagnetic driver to the rear surface of the diaphragm such that the driver will cause the front surface of the diaphragm to vibrate and reproduce sound in response to an electrical signal.

Claim 16 (currently amended): A method as set forth in claim 15 where n the textured pattern is formed of perforations ~~and/or~~ or indentations in the front surface of the diaphragm.

Claim 17 (original): A method as set forth in claim 15, wherein the diaphragm includes granular material attached to the front surface thereof, thereby defining the textured pattern.

Claim 18 (original): A method as set forth in claim 15, wherein the textured pattern is formed of a fiber compound adhered to the front surface of the diaphragm.

Claim 19 (original): A method as set forth in claim 15, wherein the textured pattern is etched into the front surface of the diaphragm.

Claim 20 (original): A method as set forth in claim 15, wherein the diaphragm includes an outer region about the periphery of the diaphragm, the density of the outer region being at least 5 pcf throughout the outer region, and an inner region circumscribed by the outer region, the density of the inner region being at or below about 3 pcf throughout the inner region, thereby providing sufficient structural stiffness to the outside perimeter of the diaphragm and eliminating the need of an outer frame; and

the method further comprising attaching a bracket to the diaphragm at two spaced locations in the outer region, the bracket extending across the inner region between the spaced locations, the electromagnetic driver being coupled to the bracket such that it is attached to the inner region of the diaphragm.

Claim 21 (original): A method as set forth in claim 20, wherein the subjecting step is performed by attaching a sheet to the front surface thereof.